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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

GRAZING MANAGEMENT PLAN AND REPORT ON CONDITION OF RANGE-- NATIONAL BISON RANGE_ MOIESE, MONTANA 1940

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GRAZING MANAGEMENT PLAN

AND

REPORT ON CONDITION OF RANGE

NATIONAL BISON RANGE

MOIESE, MONTANA

1940

Prepared at the request of
THE WILDLIFE SERVICE

By

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U. S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

REGION ONE

Evan W. Kelley, Regional Forester

BISON RANGE

MANAGEMENT PLAN

Action Section

1. Problem
2. Plan of Use
3. Pasture Schedule
4. Improvement Plan
5. Salting
6. Distribution
7. Maps and overlays (separate)

RANGE MANAGEMENT PLAN
NATIONAL BISON RANGE
MONTANA

SECTION I - ACTION

PROBLEM

The National Bison Range, located in Twps. 18 and 19 North, Ranges 20 and 21 West, in western Montana, includes 18,230 acres under fence. This area is divided into three general range units by cross fences radiating from the highest point near the center of the range. Several smaller areas are also enclosed. The general topography of the area is conical, rising from a base which is roughly square. The elevations on three sides rise from 2600 ft. along Mission Cr. to 3100 ft. on the southeast corner to the high point of 4885 ft.

This difference of slightly more than 2,000 ft. in elevation brings about a problem in seasonal control in the use of the range which is not met by the present fencing, and which has been one of the principal factors which has brought about damage and change to the forage crop.

Overstocking on the range as a whole in the past, and more recent overstocking of some of the fenced pastures with the reduced herd, has contributed to the downward trend of the general range condition.

The natural habit of buffalo to climb to the higher parts of the range has resulted in leaving feed at the lower elevations, and has caused too early use of the higher areas

during the spring months. This has been augmented in a number of places by lack of water, and by the concentration of use where the buffalo have lodged against fences in their natural movements up the slopes.

Some of the fence locations have formed "pockets" between fences. This has caused concentration of buffalo in such areas and has hindered the natural course of drift around the pastures. This has brought about damaged range in these "pockets" and has almost eliminated others from use. This condition is especially noticeable around the sheep pasture fence in the Trisky pasture. The lack of planned use in proportion to the grazing capacity of the various fenced units has resulted in overuse in some and underuse in others. The failure to recognize that certain periods of forage crop development require certain methods of management in order to maintain maximum forage production has also had much to do with the range depletion which has occurred.

In order to regain the lost production of forage which has been sacrificed in the past, and to provide a feed supply for the number of buffalo and other animals in the range, it is necessary that some permanent systematic system of animal and range control be put into effect and maintained.

Briefly the problem may be summarized as follows:

A. Original Condition.

1. An excellent range as nature made it.

B. Present Condition.

1. Producing capacity much reduced because of:

a. Intensification of use brought about by fencing.

b. Lack of systematic management of the fenced areas.

1. Overstocking.

a. On area as a whole.

b. In individual pastures after herd had been reduced.

2. Absence of adequate seasonal control.

a. Between spring and summer range.

b. Too long use on critical areas.

c. Concentration because of natural habits and faulty fence location.

d. Absence of time limits in use of pastures, causing local overstocking.

3. Insufficient distribution of water.

a. Failure to utilize Jocko River watering places to allow full use of Pauline and Trisky spring range.

b. Failure to substitute management or curtailment of numbers of animals to offset lack of water.

4. Salting for convenience of animals rather than to obtain distribution over the range.

PLAN OF USE

The recommended solution of the problem is proposed in the plan of use presented herewith. The estimated numbers of the various kinds of animals which the present production of the range will support, and the schedule for the use of the range follow. The map, with overlay, which shows geographically the plan of use and other information, accompanies this report. The map is so constructed that it can be hung on the wall or filed for ready reference.

This plan of management proposes division of the range into three seasonal areas; spring, summer and winter. This division is accomplished by the construction of a fence which will divide the summer from the spring and winter range areas. The present fences will be retained. They will serve as division fences between spring and winter ranges at their lower limits, and may also be used to aid in corralling animals or for other needed purposes. On the summer range, above the proposed seasonal division fence, the gates will all be left open during the summer period, thereby allowing access to the entire summer range. This will eliminate pocketing and resultant uneven distribution of buffalo because of fence barriers and will also minimize the amount of handling required.

The closing off of the upper end of the present mountain sheep pasture will allow segregation of these animals in a suitable area, and will make available the lower and larger part to use by buffalo by the opening of the gates. In addition, this will eliminate the lower sheep pasture fence as a barrier to the natural course of buffalo travel, relieve the too-closely used east side, and permit the buffalo free access to the west side previously very lightly used because of the fence acting as a barrier.

The schedule of use has been developed following an analysis of the seasonal growth needs of the forage on the various areas, the previous use to which each has been subjected, and the necessity for not using any area more than one period each year. This schedule applies to buffalo. The mountain sheep are to be confined to the pasture near the high point. Deer and elk are to have use of any part of the range at any season. The numbers of these animals are so small that such use will have no noticeable adverse effect, seasonal or otherwise, so long as the planned numbers are not exceeded. (See Map.)

PASTURE SCHEDULE

Buffalo (350 buffalo yearlong; to be distributed in accordance with the following schedule:)

Pasture	Period	No. of Buffalo		
Alexander winter	Nov.28 - Feb.28		350	winter
Pauline spring	Mar. 1 - May 15	212	350	spring
Trisky spring	Mar. 1 - May 15	138		
Alexander summer	May 16 - Nov.25	70	350	summer
Pauline summer	May 16 - Nov.25	166		
Trisky summer	May 16 - Nov.25	110		
Driveway summer	May 16 - Nov.25	4		
Exhibition Pasture (Hdq.)	May 1 - Oct.31	10	10	summer

(The number to be held in the Headquarters exhibition pasture to be a part of the 350 head.)

Elk

75 elk yearlong. Free access to all the range.

Deer

153 deer yearlong. Free access to all the range.

Mt. Sheep

32 sheep yearlong. Confined to sheep pasture.

The distribution of buffalo on the summer range at the beginning of the season should be as nearly as possible the capacity of each part of the area as designated in the above schedule.

IMPROVEMENT PLAN

Range improvements needed in order to carry out any systematic plan of use which provides for the correct seasonal use of the forage crop, growth and seed production, leeway sufficient for maintenance, and stocking in conformity with the amount of feed on each part of the range, will include fencing and water development.

Water Developments

Number	Source	Needed Improvement
1	Seep	Box with trough. Possible reservoir.
2	Seep	Reservoir
3 & 4	Spring	Both developed. Boxing and new trough needed. Possibility of combining flow and piping to lower range in S.W. corner. Nearly dry on June 15, 1940.
5	Spring with trough	Needs reconstruction.
6 & 7	Spring with catch basins	Spring needs protection.
8	Seep	Needs boxing and trough. If supply is sufficient, water should be piped through fence into a trough in the upper Elk Creek drainage to provide water for the Pauline summer pasture.
9 & 10	Seep	Boxing and troughs needed. Dry in June, 1940.
11	Spring trough & reservoir installed	No work needed.

Water Developments (Cont'd.)

Number	Source	Needed Improvement
12	Spring	Needs boxing and trough.
13	Reservoir in place.	
14 & 15	Seeps	Have some possibility for boxes and trough.
16	Spring	Excellent source of water. Supplies substation. Possibility of piping into lower Section 30.
17	Spring	Troughs needed.
18	Reservoir in place.	
19	Reservoir in place.	
20,21 & 22	Seep	Boxing and troughing needed.
23 & 24	Reservoirs in place.	
25	Reservoir in place.	
26	Reservoir in place	
27	Spring	Boxing and trough.
28	Spring	Developed with box and trough.
29,30,31 32 & 33	Spring	Troughed and protected source.
34	Spring with concrete trough overflowing into reservoir.	
35	Spring-fed reservoir.	
36,37 & 38	Reservoirs	Short season water only from spring surface run-off.
39	Spring	Good source but too close to No. 35 to justify development.
40	Spring-fed reservoir.	
41	Spring-fed reservoir in corrals.	

Water Developments (Cont'd.)

Number	Source	Needed Improvement
42	Possible location for trough to be filled by water piped from No. 41. Will provide water for dry north exposure above fence.	
43	Spring with trough.	
44	Mission Creek. Continuous water.	
45	Irrigation canal opposite office building.	
46	Jocko water gap - N.E. ¼ sec. 27, T. 18 N, R. 21 W.	
47	Jocko water gap - N.W. ¼ sec. 27, T. 18 N, R. 21 W. Questionable development with Nos. 6 & 7 so near.	
48	Jocko water gap - S.E. ¼, sec. 26.	
49	Jocko water gap - south line sec. 25, T. 18 N, R. 21 W.	
50	New sheep pasture to be constructed.	
51	Older sheep pasture fence to be removed.	

The development of each of the above must be considered in terms of the seasonal need of the area in which they occur. On the March 1 to May 15 range, a flow would be necessary during that period only. This would justify development of sources of only short season supply, provided such flow occurred during the season of use. On the contrary, development of sources of early spring water would not be justified on summer range if the flow was not available during at least a part of the period of summer use.

A number of the listed sources must be prospected in order to determine if the supply is sufficient for use and

for what period. If funds are not sufficient to do this all at one time, the possibilities in the driest areas should be exploited first and if the flow is sufficient, these should have immediate development. Nos. 1, 2, 8, 9, and 10 are of first priority. Nos. 12, 13, 14, 15, 42, 3 and 4 are second in priority. Most of the seeps will provide a seasonal supply of water only. These should be drained to a central box and piped to a trough leaving the source dry and without obstruction. This eliminates fencing of sources and the obstruction of fences.

Fences

The type of fence to be constructed is left to the Fish & Wildlife Service for decision.

This range falls into two seasonal zones of development, dividing on the north side at about 3,600 feet, and on the south, east and west at about 3800 feet elevation. In order to obtain the early feed during the spring period and the later developing feed in the summer, a division fence is necessary. Under present management the natural tendency of the buffalo is to work to the higher areas too soon after the snow has gone. This results in premature use of the higher range and waste of feed on the low, earlier developing areas. The seasonal division fence will permit a system of management which will confine the buffalo to definite pastures, use of which is best suited to the development

of the forage during the particular season of use, and will at the same time permit maintenance of the forage crop through planned use. This plan of use has been outlined previously in this report.

In order to accomplish this, the proposed fence must be built at the locations marked on the map. It has been laid out so that the feed is divided into areas of use sufficient to feed 350 buffalo for the indicated time each is to be used. It has been so routed that it will prevent pockets being formed. Such pockets concentrate buffalo causing severe damage to the range and preventing the use of other areas because improperly placed fences obstruct the natural swing of the animals in covering the range. The course laid out for the fence should be followed closely as shown on the map.

Exterior Fences

On the south side the extension of the exterior fence to the refuge lines will aid materially in bettering the water situation by including three much needed watering places on the Jocko River. These are numbered 46 - 48 - 49 on the map. A fourth extension, No. 47, might also be made which would provide a watering place on the Jocko River at the mouth of Elk Creek; but since a plentiful supply of water is available on Elk Creek a short distance from its confluence with the Jocko, this extension of fence is not considered necessary.

The banks are quite abrupt at these points, and some reduction of grade may be necessary in order to facilitate the approaches to the water.

These watering places are important to the use of the range, since they are contiguous to feed areas which are not now receiving full use because the present watering places are too distant.

In order to allow free passage through the land leading to the corrals on the north side, two additional gates are needed. These will allow buffalo on the summer range to pass through at several places, and will prevent concentration through the now existent gates. The lane fences run directly up the slope and form a barrier to the normal course of travel along the easy grades which the buffalo use. The addition of these gates will allow free passage in going from one part of the summer range to another, and will prevent pocketing of animals.

In the upper end of the present sheep pasture a cross fence must be constructed to segregate the area to be used in the future as a sheep pasture from the remainder of the pasture now fenced for that purpose; No. 50 on the map.

As provided in the plan of use, all of the present interior fences will be retained, and on the summer range the gates will be left open, thereby allowing unrestricted passage from one part of the summer area to another.

One exception to this should be noted. The lower part of the present sheep pasture fence which, after erection of the cross fence segregating the upper end as a permanent sheep pasture, will be included as part of the Trisky summer range, should be removed since it serves no useful purpose and unless the gates are kept open it will nullify proper use of the Trisky summer area.

The scaled mileage of proposed fence is listed below:

1.	Division fence segregating summer range	12 mi.
2.	Sheep pasture fence	1.25 mi.
3.	Jocko watergap exterior fences	3 mi.
4.	Proposed exhibition fence	5.25 mi.
	Total	21.50 mi.

Exhibition Pasture

It is understood that a movement is advocated to turn part of the southwest corner of the Trisky pasture into an exhibition area which can be observed from the railway and from Highway Alternate No. 10 and No. 93, which fork at this point.

In order to furnish sufficient native range to provide enough grass to feed an exhibition herd of 12 buffalo for the duration of the tourist season, it would be necessary to fence in 58 forage acres of feed, which on this area will require at least 160 surveyed acres. This would require either a narrow strip near the fence, which would be in sight from the routes of travel, and which would occupy steep slopes

unsuited to maintenance of the forage crop with animals confined to such an area, or inclusion of land too far back to have the buffalo visible at all times from the railway and highway. This is not recommended.

In lieu of this proposed area, the Jocko bottom between the present south refuge fence on the north, the forks of the highway right-of-way on the east, the railway right-of-way on the south and extending as far as the west refuge boundary fence line, would provide a greatly superior area for exhibition purposes. The elevated highways at this point, and the contiguous railway, provide ideal vantage points for observation.

This is privately-owned at present, and it is not known whether it could be acquired. However, if it could be obtained, it would not only provide an ideal area from which game could be viewed, but it could be irrigated and thereby provide a maximum of dependable feed. It would also eliminate complication of the refuge range management plan by adding additional fences, and the shifting of management to meet the changed circumstances brought about by the inclusion of an exhibition pasture inside the present refuge fences.

Much of this area is now covered with tall brush and scattered trees. These would have to be removed in order to provide an unobstructed view of the exhibition animals and to allow for cultivation, planting and irrigation.

It is recommended that this area be acquired, improved by clearing, irrigation and the planting of grass for use as an exhibition pasture.

SALTING

In devising a systematic plan for salting buffalo, two major points should be kept in mind.

1. Locate salt so as to place it in areas which are lightly utilized; avoid placing it where sufficient use of the forage is obtained without it. Unless there are exceptional circumstances, never place salt close to water. The necessity for using the water will draw the animals to the watered area, thereby eliminating the necessity for using salt for this purpose. Salt placed on the lightly used parts of the range induces them to make more use of the feed in such localities.

(a) Always consider any salt distribution scheme as adjustable, rather than as a fixed plan for permanent location, since weather, improvements, habits of animals and other factors change the manner in which they use the forage. This change of use requires the placing of salt in new locations to meet the changed circumstances as they develop.

2. Salt by seasonal areas. Under the plans of use devised for the refuge, the seasonal ranges are divided

by fence. Under these circumstances only sufficient salt to provide for the requirements of the animals while they are on each seasonal range need be placed on each. Salt should be in place when the buffalo enter a different area. This aids materially in securing distribution over the unit from the beginning of use. Until the proposed fences are constructed and the seasonal ranges are separated by fence, the distribution of salt should be confined to the seasonal area designated for use during each particular period of the season. After the period during which use is desired of any area is over, the remaining salt should be gathered and transferred to the next area to be used. This assistance to distribution will retard the drift of the animals to other parts of the range which are not sufficiently developed for use, or are being withheld to allow further growth following use. The absence of salt on such areas tends to cause them to remain on the ranges upon which salt is distributed, and which should be used during that particular period of the year, thereby capitalizing upon the attraction of salt to assist in holding them on the proper range during its designated season. Skilfully located salt is an influential factor in obtaining more uniform distribution of animals, and consequent even utilization of

the forage. It can, however, substitute only partially for the control obtained by properly located fences.

DISTRIBUTION

In order to secure the desired results from the plan of management, it is essential that the schedule be strictly adhered to. Buffalo must be moved to the next range designated for use at the scheduled time, and the gates closed. It is not enough to open the gates and allow the animals to drift through at will.

When moving buffalo from one range to another, the entire herd should not be pushed through one gate, thereby encouraging excessive use in any one area; but all gates should be used, and smaller groups put through each. This will distribute the herd more widely, and discourage spotted use of the forage crop.

SUPPLEMENTAL SECTION

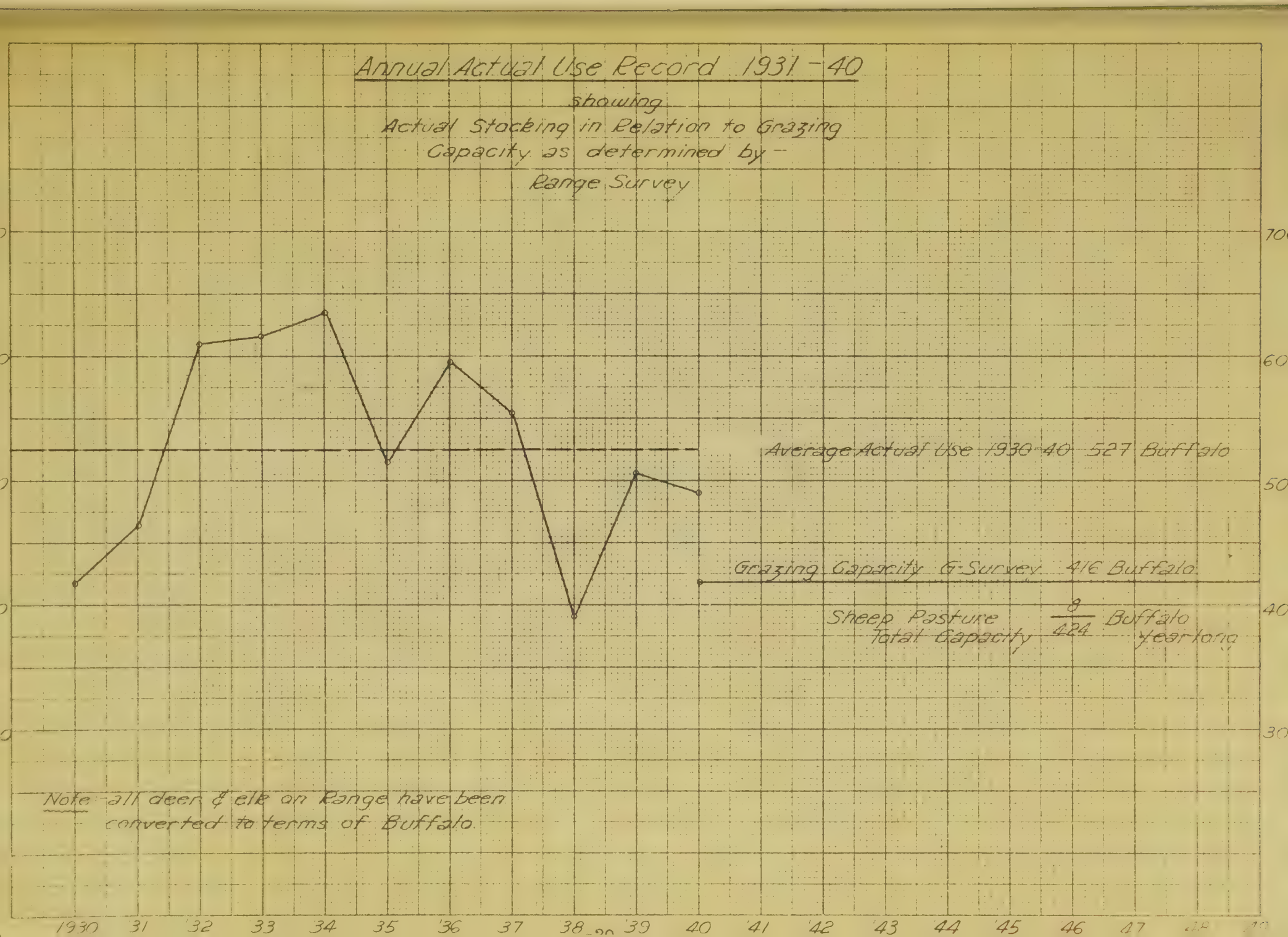
1. Animal population 1930 - 1940.
2. Animal population 1930 - 1940 graph.
3. Comparative yield of Bison Range 1931 - 1940.
4. Interpretation of range conditions 1940.
5. Depletion map.
6. Classification of forage changes by significant groups.
7. Type classification, range survey 1940.
8. Type map, range survey 1940.
9. Plant composition comparison 1931 - 1940
10. Determination of grazing capacity - Method.
11. Method used to establish forage acre requirements.
12. Sources of weights used.
13. Forage acre data used and grazing capacity for various classes of game animals.
14. Relationship of cattle to native ruminating game animals.
15. Follow-Up and maintenance.
16. Summary of range survey compilation results.

Annual Actual Use Record 1931 - 40

showing

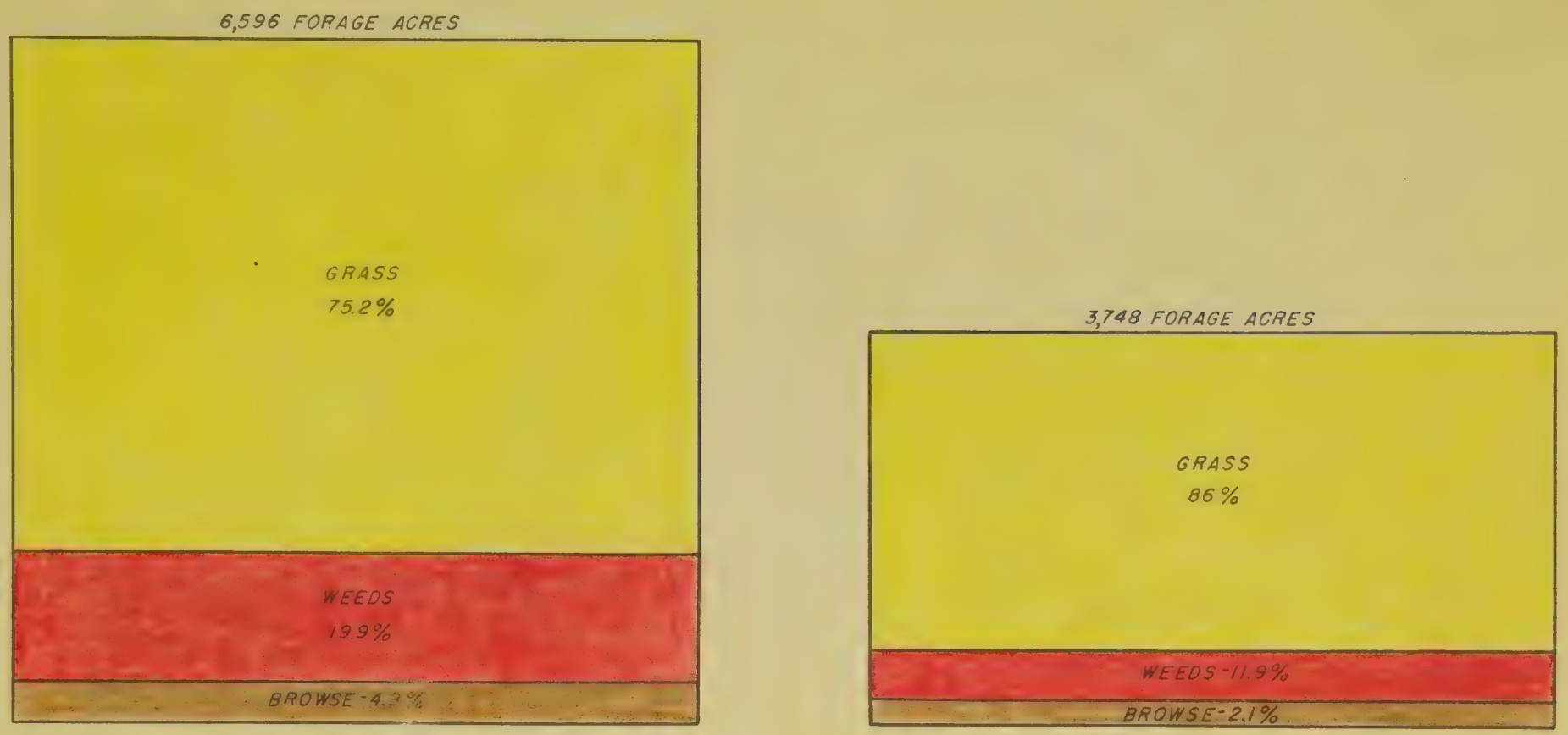
Actual Stocking in Relation to Grazing Capacity as determined by -

Range Survey



Note - all deer & elk on Range have been converted to terms of Buffalo.

COMPARATIVE YIELD OF BISON RANGE



Gross decrease of all production 1931-1940 43.2%

Change in Composition of Stand 1931-1940

Grass has increased 11%

Weeds have decreased 8%

Browse has decreased 3%

INTERPRETATION OF RANGE CONDITIONS

1940

WITH DEPLETION MAP

The map on page 26 shows graphically the depletion of the various range areas on the refuge. These are shown in colors in order to be readily distinguishable. The following description explains the condition of each:

1. Bluebunch wheatgrass with buffalo bunchgrass secondary. This is the original stand on nearly all exposures except north.

2. Idaho fescue with bluebunch wheatgrass secondary. This is the original stand on north exposures. These areas have changed so that now bluebunch wheatgrass is predominant with Idaho fescue secondary.

3. Bluebunch wheatgrass with Sandberg bluegrass secondary. This is a common stage of depletion in which Sandberg bluegrass has replaced the buffalo bunchgrass and Idaho fescue. This replacement grass produces much less than the grasses it replaced, and is of value chiefly as early spring and fall feed.

4. Bluebunch wheatgrass with needle and thread grass secondary. Another stage of depletion where the buffalo bunchgrass and Idaho fescue has been replaced by the needle and thread grass. This combination is infrequent.

5. Bluebunch wheatgrass with western wheatgrass secondary. In this stage of depletion the buffalo bunchgrass and Idaho fescue has been replaced by western wheatgrass, and the bluebunch wheatgrass has become secondary. This grass usually comes in on the bottoms and on the heavier soils. Infrequent.

6. Bluebunch wheatgrass with cheatgrass secondary. The presence of cheatgrass denotes the lowest stage of the grasses. It is an annual and compared to the native perennial grasses is of low value and small production. If the areas where it is present are moderately grazed, it will be succeeded by Sandberg bluegrass, bluebunch wheatgrass, Idaho fescue and buffalo bunchgrass successively. On the areas shown in red, the bluebunch wheatgrass remains dominant, with the cheatgrass encroaching.

7. Bluebunch wheatgrass with other annual brome grasses. This is a stage of depletion similar to No. 6, but with less common annual species.

8. Western wheatgrass with bluebunch wheatgrass secondary. On the flatter lands on Post Creek where poorer soil conditions prevail, western wheatgrass is native, occurring with bluebunch wheatgrass. On these areas, however, the amount has increased, while bluebunch wheatgrass has decreased because of the close use made of it.

9. Sandberg bluegrass predominating. This is a case of nearly complete replacement of the better grasses because of too close use and because of the combination of lack of competition by the native grasses which were once present, and of weather conditions favoring the growth of Sandberg bluegrass. During periods of below average rainfall, coupled with overuse by animals, the native grass is depleted since it depends partially on early summer rainfall for maturity. The Sandberg bluegrass matures on the spring moisture and takes advantage of the lessening of the other grasses to increase during periods of low precipitation. Both use and weather conditions are factors in the increase of this grass.

10. Cheatgrass predominating. Where this grass occurs in nearly pure stands, and the area is closely used, it may be expected that weed stands will follow. If these areas are lightly used, the perennial grasses will eventually crowd it out.

Even though the major part of the range is in various stages of depletion, recovery may be expected in the course of time and with continued use, providing the scheduled management of animals is adhered to and numbers are not allowed to increase

until such time as this is amply justified by a previous increase of forage production.

The retention of the present interior division fences will permit controlled use of the various parts of the summer range if it should develop that sufficient use of any of these is not made while the buffalo have free access to all parts. This is a method which it is possible to use should circumstances develop which would require it.

DEPLETION MAP

MAP OF

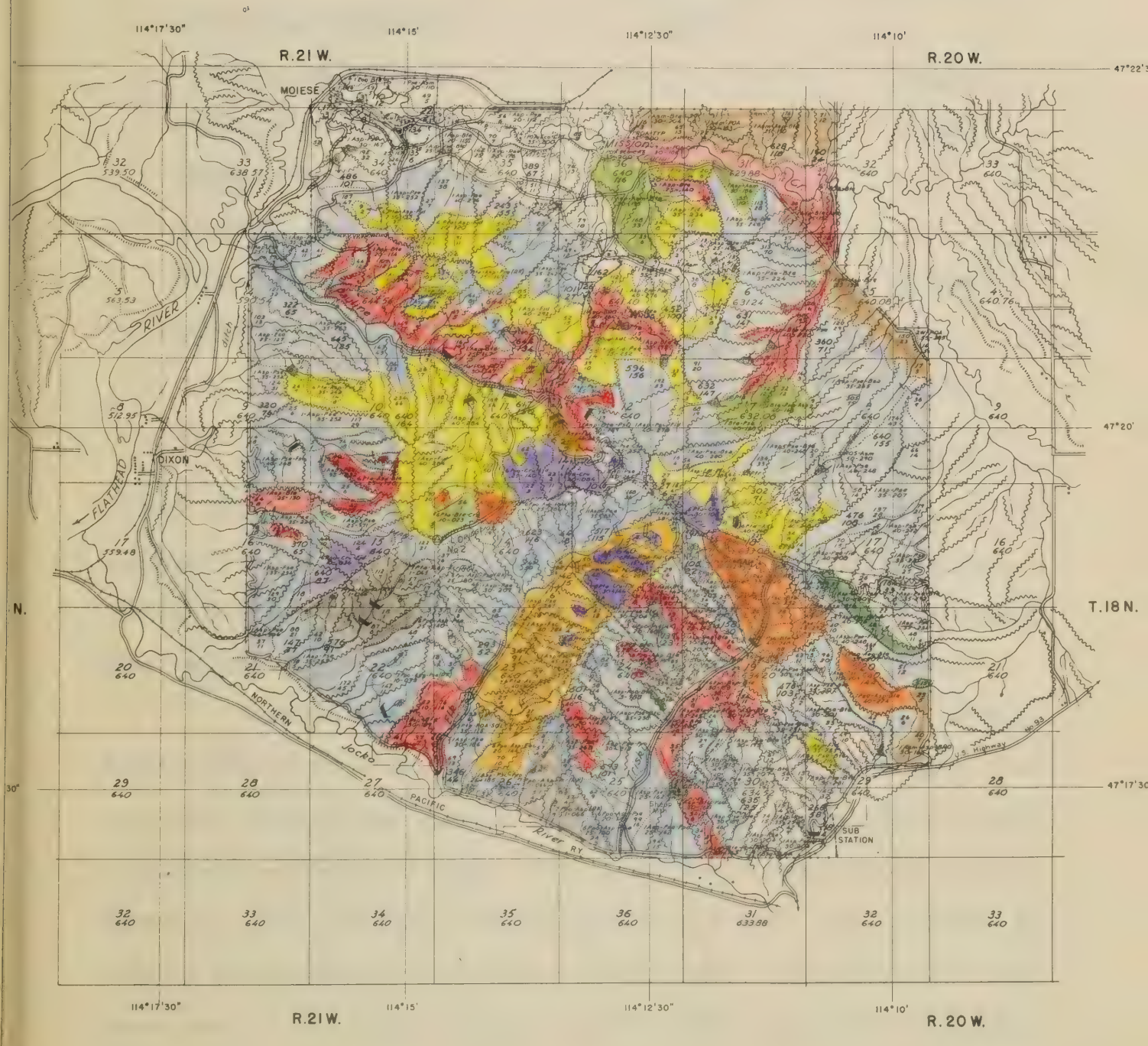
RANGE SURVEY

NATIONAL BISON RANGE

SCALE 2"= 1 MILE

CHIEF OF PARTY—R.M. DE NIO

1940



CLASSIFICATION OF FORAGE CHANGES BY SIGNIFICANT GROUPS 1931 - 1940.

1. High Value Forage Grasses - Native Perennials.

	% Increase	% Decrease
Agropyron spicatum	9.876	
Festuca idahoensis		4.136
Festuca scabrella		.098
Agropyron smithi	1.940	
Koeleria cristata	.055	
Carex		1.266
Carex filifolia	.248	
	12.119	5.500

Some high value native perennials have increased 12.1% since 1931. This applies to the range as a whole, but is not indicative of the changes in each of its separate pastures. While this general gain was being made there was a loss over the entire range by other high value perennials of 5.5%.

Festuca idahoensis and Festuca scabrella, two of the best grasses on the range, continue to show a decrease. These are used during the summer months, and too close grazing will eventually eliminate them. Dry land Carex also shows a decrease. This species remains green well into dry periods, and has an added appeal to game at that time. This probably has been one of the main reasons for its close use and consequent decrease.

The increase of Agropyron spicatum has probably been due to the lightening of use on some areas, its use as winter feed under normal stocking, and distribution conditions, and the opportunity afforded it to produce seed over most of the range each season. The grass is aggressive and reproduces readily from seed and will displace replacement species. It is one of the dominant species in the native stand. Agropyron smithi, the common bluejoint, has increased on the heavy soils principally in Alexander Basin. This is good feed, but is not as heavy a producer as the native bunchgrass.

2. Replacement Perennials

	% Increase	% Decrease
Poa secunda	1.662	
Sporobolus cryptandrus	.124	
Poa pratensis	.498	
Bromus marginatus		.193
Phleum pratense	.043	
Stipa comata		.386
	2.317	0.579

Poa secunda is the replacement species which has shown the greatest increase of the secondary native grasses. Most of this had occurred prior to 1931, since at that time it made up 15.5% of the total stand. Between 1931 and 1940 it had increased 1.6%. This grass is typical of the replacement species which are good feed during certain seasons, but are of

negligible value at other periods, and which have a much smaller yield than the native perennials which they replaced.

Sporobolus cryptandrus is an invader which takes advantage of a broken cover to increase. It provides good feed, but is dependent upon good summer moisture for abundant growth. Poa pratensis (Kentucky bluegrass) and Phleum pratense (timothy) are escapes from cultivation. Both produce good feed, but are usually limited to the more moist locations. These are few on this range. Bromus marginatus has decreased. This is another species which comes in when the best native perennials are thinned. Stipa comata, commonly known as needle grass, is native in the stand, but in small amounts. Because of its efficient seeding habits it increases rapidly when the native stand is reduced. Its decrease is usually significant of a thickening of the better grasses.

3. Replacement Annuals

	% Increase	% Decrease
Bromus tectorum	5.880	
Bromus anomalus	2.390	
Bromus racemosus		3.288
Bromus mollis		1.670
Festuca octoflora		1.128
Festuca megalura		0.087
	8.270	6.173

This group are all annual grasses, and most of them are of low feed value except in the spring or fall. Festuca octoflora may be classed as worthless and Festuca megalura or foxtail fescue is so infrequent to be negligible. The annual bromes are abundant and well distributed. All of the species listed are very similar to the casual observer, and are usually all classed as cheatgrass. So far as is known, this grass entered North America about 1850 from Europe. It is a winter annual, and is a prolific seed producer. It invades stands of grass wherever the ground has been disturbed for any reason, whether it be breakdown because of too extreme grazing, burrowing rodents or mechanical action. It is an unfailing indicator of below normal range conditions, and represents the lowest stage of grass cover.

These groups of grasses, which make up 86% of the cover in 1940, may be summarized as follows:

				Net Change 1931-1940	
1.	High value native perennials	Increase 12.1%	Decrease 5.5%	Increase 6.6%	Decrease -
2.	Lower value replacement perennials	2.3	.58	1.7	-
3.	Replacement annual grasses	8.3	6.2	2.1	-

Total forage acres: 1931 - 6,596 1940 - 3,748

2,848 or 43.2% decrease.

These figures carry the following significance:

1. The difference of 43.2% decrease in forage acres since 1931 illustrates the loss of production which has taken place since that time. This has, no doubt, been partially due to the dry seasons which have occurred, beginning with 1929, in this section of the State. This condition has been accelerated by overstocking of pastures by holding the animals to such areas for a period which used the feed beyond the danger point. Waste of feed has occurred in parts of some pastures because of lack of water and the absence of a seasonal division fence to divide the low and high range so that the feed on each seasonal area could be used during its proper period. The results of holding the buffalo in one pasture throughout the growing season, thereby fully using the crop during the critical period, and preventing the development of a seed crop, is especially evident in the Trisky pasture where most damage has been sustained.

2. The trend of the change in composition of the range crop is toward an increase of the grass and a decrease of weeds. Grass which now makes up 86% of the feed on this range has increased on the range as a whole since 1931, while weeds have decreased. (See diagram.) Due to lack of uniform distribution of buffalo in numbers which conform to the amount of feed in the various pastures, this trend is not the same for all pastures. The Trisky pasture is in the poorest condition.

3. The net change of all three groups of grasses shows an increase. This indicates that the stand is thickening, but that to 1940 the increase of the best grasses is not sufficient to prevent the spread or displace the poorer ones. However, even though the trend is slowly in the constructive direction on the range as a whole, it is necessary that systematic use be made of the pastures, and in relation to the amount of forage in each, in order to avoid damage to one or more pastures and to allow for continued betterment.

TYPE CLASSIFICATION
RANGE SURVEY - 1940

Type		Surface Acres		Forage Acres		Ratio of FA to SA
Primary Species	Secondary Species	Number	Percent	Number	Percent	FA : SA
Agropyron spicatum	Festuca idahoensis	1936	10.62	533	14.17	1:3.63
"	Agropyron smithii	266	1.41	49	1.30	1:5.22
"	Bromus carinatus	34	.19	9	.23	1:3.79
"	Bromus tectorum	1764	9.68	308	8.18	1:5.72
"	Poa secunda	8888	48.75	2008	53.51	1:4.43
"	Festuca scabrella	567	3.11	169	4.49	1:3.35
"	Stipa comata	85	.47	16	.43	1:5.31
"	Elymus condensatus	133	.73	17	.46	1:7.82
Agropyron smithii	Agropyron spicatum	597	3.27	103	2.74	1:5.79
Bromus tectorum	-	201	1.10	34	.90	1:5.91
Poa pratensis	-	98	.54	31	.82	1:3.16
Poa secunda	-	551	3.02	122	3.24	1:4.51
Stipa comata	-	5	.03	1	.03	1:5.00
Elymus condensatus	-	6	.03	1	.03	1:6.00
Total Grassland		15,121	82.95	3399	90.38	1:4.44
Pseudotsuga taxifolia 6 & 7		894	4.90	122	3.24	1:7.32
Pinus ponderosa 6 & 7		1,624	8.90	187	4.97	1:8.68
Juniperus scopulorum		389	2.12	40	1.06	1:9.65
Total Timberland		2,907	15.92	349	9.27	1:8.32

Type		Surface Acres		Forage Acres		Ratio of FA to SA
Primary Species	Secondary Species	Number	Percent	Number	Percent	FA : SA
5 Prunus demissa		6	.03	2	.05	1:3.00
5 Philadelphus lewisii		14	.08	2	.05	1:7.00
5 Rosa nutkana		15	.07	4	.11	1:3.25
5 Crataegus douglasii		26	.16	5	.14	1:5.00
Total Browse		61	.34	13	.35	1:4.69
Populus tremuloides		20	.11	2	.05	1:10.00
Total Aspen		20	.11	2	.05	1:10.00
8 Barren Rock		25	.15	0	0	0
Total Rock		25	.15	0	0	0
Cultivated Pasture		34	.19	-	0	0
Total Cultivated		34	.19	-	0	0
Corrals		62	.34	0	0	0
Total Corrals		62	.34	0	0	0
GRAND TOTAL OF ALL TYPES ON BISON RANGE INSIDE OF BOUNDARY FENCE		18,230	100.00	5763	100.00	1:4.84

MAP OF

RANGE SURVEY

NATIONAL BISON RANGE

SCALE 2"= 1 MILE

CHIEF OF PARTY—R.M. DE NIO

1940

MAP LEGEND

DIXON'S COLOR NOS.

- 353 — 1- GRASSLAND
- 324 — 2- MEADOW
- 321-1/2 — 3- WEED
- 343 — 4- SAGEBRUSH
- 325 — 5- BROWSE
- 354 1/2 — 6- TIMBERED RANGE
- NO COLOR — 7- WASTE
- NO COLOR — 8- BARREN
- 375 — 9- JUNIPER WOOD
- 322 — 10- ASPEN
- 349 — 18- CULTIVATED
- RED H.E.S. — HOMESTEAD
- RED M.C. — MINING CLAIM
- RED STATE-R.R. — STATE OR R.R.
- GREEN A.S. — ADMINISTRATIVE SITE-(FENCED)
- GREEN S.U. — SPECIAL USE
- POND OR LAKE-(BLUE)
- EXISTING FENCE
- PROPOSED FENCE
- PRIVATE FENCE
- GOOD MOTOR ROAD
- POOR MOTOR ROAD
- TRAIL
- BROWN — EXISTING DRIVEWAY
- BROWN — PROPOSED DRIVEWAY
- RAILROAD
- TELEPHONE LINE
- TELEPHONE LINE ALONG ROAD
- ELECTRIC POWER LINE
- DITCH — DITCH OR CANAL
- FLUME
- DISTRICT RANGER STATION
- GUARD OR RANGER STATION
- SHEEP CAMP
- HOUSE-(OCCUPIED)
- HOUSE-(UNOCCUPIED)
- SCHOOLHOUSE
- CHURCH
- CEMETERY
- WINDMILL
- GATE

- RESERVOIR & DAM-(BLUE)
- SAWMILL-(STATIONARY)
- MINE OR QUARRY
- CORRAL
- SPRING
- WELL
- DEVELOPED WATER
- PROPOSED WATER
- IMPROVED FOREST CAMP
- IMPROVED PICNIC GROUNDS
- NATURAL BARRIER
- RED 7 — POSTED SALT GROUND
- RED 7 — PROPOSED SALT GROUND
- LAMBING GROUNDS
- NATIONAL FOREST BOUNDARY
- ADJACENT NATIONAL FOREST BOUNDARY
- STATE LINE
- COUNTY LINE
- GAME OR BIRD REFUGE BOUNDARY
- PRIMITIVE AREA BOUNDARY
- TRIANGULATION STATION
- BLACK — UNIT LINE
- GREEN — MANAGEMENT LINE
- ORANGE — ALLOTMENT BOUNDARY
- VIOLET — GAME & RECREATION
- BLUE — RANGER DISTRICT
- RED — PRIVATE LAND
- BLACK — SEASONAL ZONE

TYPE DESIGNATION

IN ORDER —
- DENSITY - FORAGE ACRE FACTOR
- SURFACE ACRES
- FORAGE ACRES

B.D.-BAND DAYS
D.U.-DISTRIBUTION UNIT
C.U.-CAMP UNIT
S.A.-SURFACE ACRES
F.A.-FORAGE ACRES
C.M.-COW MONTHS
S.M.-SHEEP MONTHS
G.C.-GRAZING CAPACITY

Plant Composition Comparison

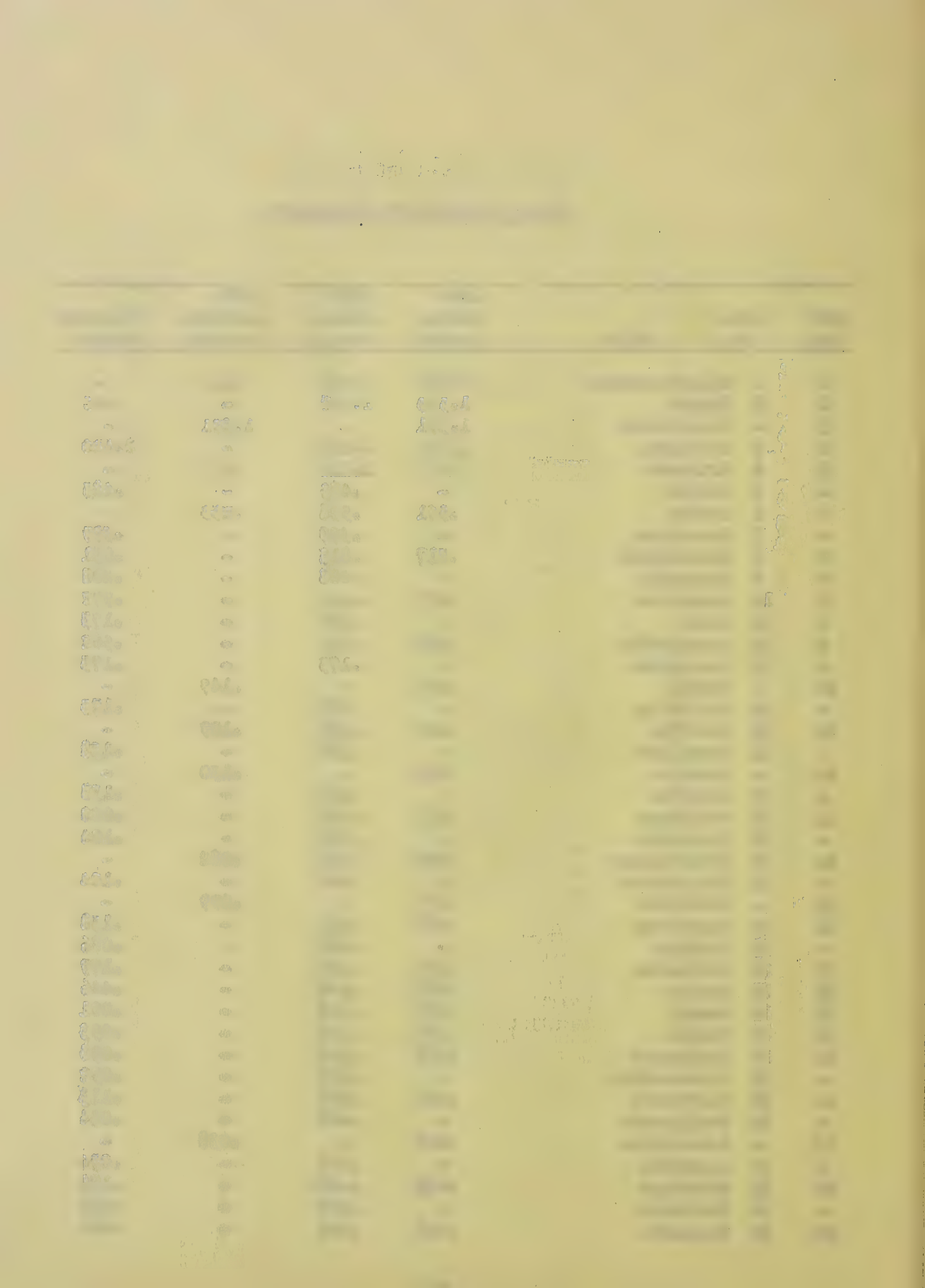
1940 No.	1931 No.	GRASS	1940 Survey Percent	1931 Survey Percent	1940 Increase Percent	Decrease Percent
1	1	Agropyron spicatum	39.371	29.459	9.876	-
2.	-	Poa secunda	16.997	-	16.997	-
-	2	POA	-	15.477		15.477
3	3	Bromus tectorum	10.681	4.801	5.880	-
4	4	Festuca idahoensis	3.602	7.738	-	4.136
-	5	Bromus racemosus	-	3.288	-	3.288
5	6	Poa pratensis	2.608	2.110	.498	-
6	7	Festuca scabrella	2.452	2.550	-	.098
7	8	Agropyron smithii	2.379	.439	1.940	-
8	-	Bromus anomalus	2.390	-	2.390	-
9	-	Cala.agrostis rubescens	1.925	-	1.925	-
-	9	Bromus hordeaceus	-	1.670	-	1.670
10	10	Koeleria cristata	1.198	1.143	.055	-
-	11	CAREX	-	1.266	-	1.266
11	12	Elymus condensatus	.755	1.934	-	1.179
-	13	Poa glaucifolia	-	.703	-	.703
12	14	Stipa comata	.317	.703	-	.386
13	-	Carex filifolia	.248	-	.248	-
14	15	Juncus sp.	.168	.175	-	.007
15	-	Carex atrata	.155	-	.155	-
16	16	Festuca octoflora	.155	1.283	-	1.128
17	-	Sporobolus cryptandrus	.124	-	.124	-
18	-	Distichlis stricta	.093	-	.093	-
-	17	Festuca megalura	-	.087	-	.087
19	-	Carex sp.	.074	-	.074	-
-	18	AGROSTIS		.052	-	.052
20	-	Phleum pratense	.043	-	.043	-
21	-	Aristida longiseta	.030	-	.030	-
22	19	Hordeum jubatum	.031	.087	-	.056
23	20	Bromus marginatus	.018	.211	-	.193
24	-	Agropyron pauciflorum	.012	-	.012	-
25	-	Poa compressa	.000	-		
		Others	.093	-	.093	-
		TOTAL	85.927%	75.176	40.477	29.726

Plant Composition Comparison

1940 No.	1951 No.	GRASS	Times Listed	Times Listed
1	1	Agropyron spicatum	150	42
2	-	Poa secunda	140	
-	2	POA		48
3	3	Bromus tectorum	136	21
4	4	Festuca idahoensis	88	26
-	5	Bromus racemosus		22
5	6	Poa pratensis	42	2
6	7	Festuca scabrella	38	14
7	8	Agropyron smithii	30	5
8	-	Bromus anomalus	116	
9	-	Calamagrostis rubescens	13	
-	9	Bromus hordeaceus		6
10	10	Koeleria cristata	82	13
-	11	CAREX		11
11	12	Elymus condensatus	35	11
-	13	Poa glaucifolia		3
12	14	Stipa comata	39	5
13	-	Carex filifolia	8	
14	15	Juncus sp.	5	1
15	-	Carex atrata	4	
16	16	Festuca octoflora	20	9
17	-	Sporobolus cryptandrus	5	
18	-	Distichlis stricta	3	
-	17	Festuca megalura		1
19	-	Carex sp.	3	
-	18	AGROSTIS		1
20	-	Phleum pratense	2	
21	-	Aristida longiseta	4	
22	19	Hordeum jubatum	1	1
23	20	Bromus marginatus	1	3
24	-	Agropyron pauciflorum	1	
25	-	Poa compressa	1	
		Others	2	

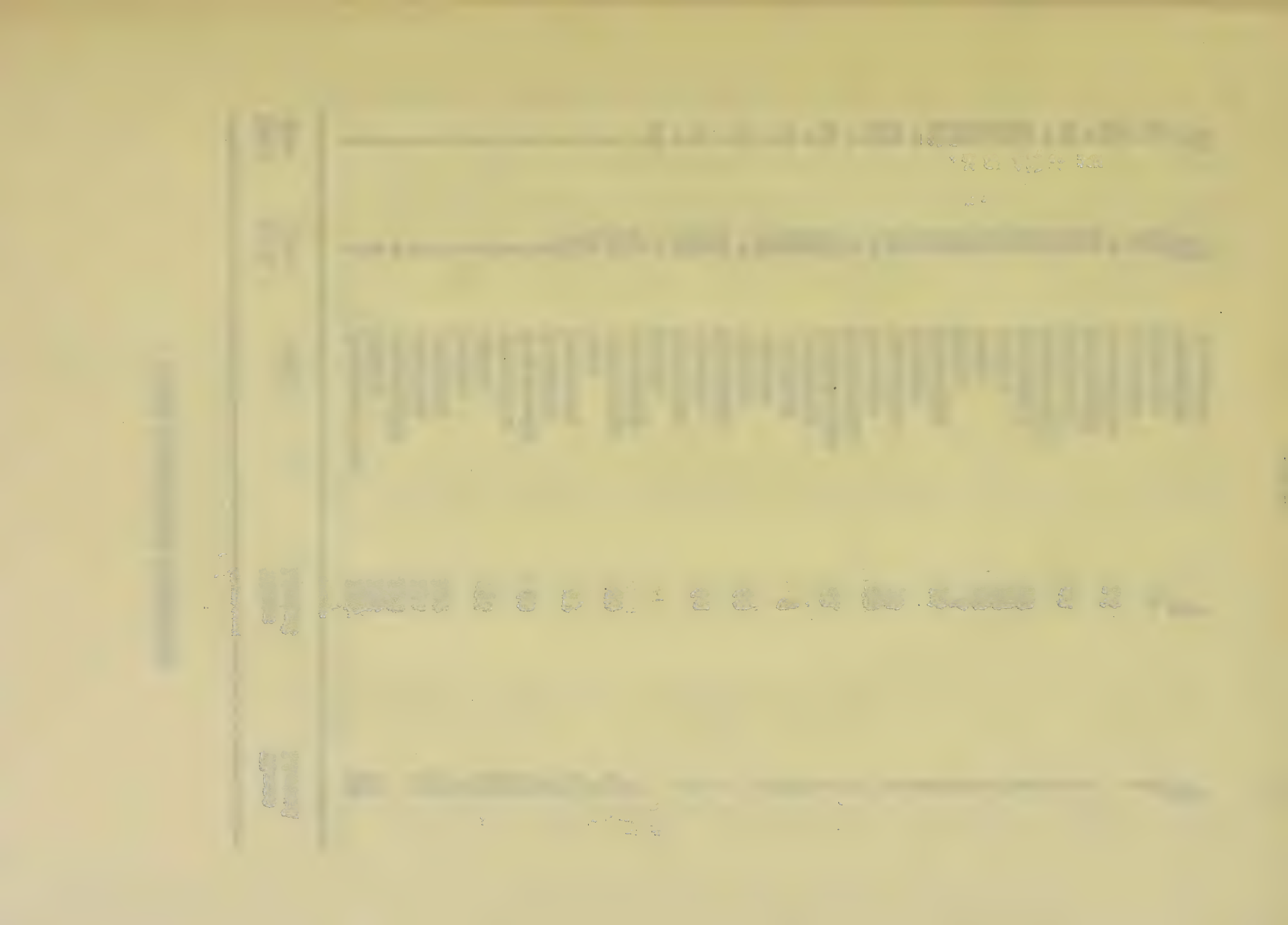
Plant Composition Comparison

1940 No.	1931 No.	[illegible]	1940 Survey Percent	1931 Survey Percent	1940 Increase Percent	Decrease Percent
1	1	Balsamorrhiza	2.583	2.464	.119	-
2	2	Lupine	1.533	1.978	-	.445
3	-	Sisymbrium	1.391	-	1.391	-
4	3	Achillea	1.285	4.165	-	2.880
5	4	Erigeron	1.223	1.110	.113	-
-	5	Galium	-	.489	-	.489
6	6	Arnica	.571	.538	.033	-
-	7	Cerastium	-	.399	-	.399
7	8	Chrysopsis	.217	.015	-	.631
-	9	Comandra	-	.208	-	.208
8	10	Leontodon	.173	1.145	-	.972
-	11	Geum	-	.173	-	.173
9	12	Antennaria	.149	.711	-	.562
-	13	Cardamine	-	.173	-	.173
10	-	Montia	.149	-	.149	-
-	14	Trifolium	-	.173	-	.173
11	15	Cirsium	.143	.034	.109	-
-	16	Heracleum	-	.138	-	.138
12	-	Clarkia	.130	-	.130	-
-	17	Senecio	-	.138	-	.138
13	18	Solidago	.118	.138	-	.020
-	19	Synthyris	-	.104	-	.104
14	20	Orthocarpus	.099	.017	.082	-
-	21	Thalictrum	-	.104	-	.104
15	-	Phacelia	.077	-	.099	-
16	22	Penstemon	.087	.225	-	.138
-	23	Vagnera	-	.086	-	.086
17	24	Hieracium	.081	.260	-	.179
18	25	Urtica	.074	.520	-	.446
19	26	Geum	.068	.069	-	.001
20	27	Crepis	.068	.121	-	.053
21	28	Eriogonum	.058	.156	-	.098
-	29	Drymocallis	-	.052	-	.052
22	30	Sieversia	.043	.156	-	.113
-	31	Gaillardia	-	.034	-	.034
23	-	Potentilla	.038	-	.038	-
-	32	Apocynum	-	.034	-	.034
24	33	Plantago	.038	.208	-	.170
-	34	Ratibida	-	.034	-	.034
25	35	Fragaria	.031	.052	-	.021



[illegible] Correction Curve

1940 No.	1932 No.	[illegible]	Times Listed	Times Listed
1	1	Helianthus	136	29
2	2	Lupine	132	39
3	-	Gaillardia	130	
4	3	Achillea	124	47
5	4	Erigeron	122	26
-	5	Galium		6
6	6	Aster	76	15
-	7	Geranium		10
7	8	Chrysopsis	60	16
-	9	Grindelia		6
8	10	Leontodon	53	10
-	11	Coreopsis		4
9	12	Antennaria	60	13
-	13	Carduus		2
10	-	Rudbeckia		
-	14	Trifolium		1
11	15	Silene	52	1
-	16	Tragopogon		1
12	-	Clarkia	50	
-	17	Senecio		4
13	18	Solidago	7	3
-	19	Gutierrezia		2
14	20	Orthocarpus	41	1
-	21	Thalictrum		2
15	-	Mimulus	39	
16	22	Penstemon	35	6
-	23	Vaquera		1
17	24	Hieracium	36	0
18	25	Urtica	6	5
19	26	Cuscuta	23	3
20	27	Crepis	27	3
21	28	Eriogonum	22	4
-	29	Erysimum		2
22	30	Mimosa	20	5
-	31	Gaillardia		1
23	-	Potentilla	16	
-	32	Agoseris		1
24	33	Plantago	19	3
-	34	Antirrhinum	7	2
25	35	Fragaria	9	2



Plant Composition Comparison

1940 No.	1951 No.	[illegible]	1940 Survey Percent	1951 Survey Percent	1940 Increase Percent	Decrease Percent
-	36	Amphalis	-	.034	-	.034
26	-	Lupula	.031	-	.031	-
-	37	Vicia	-	.034	-	.034
27	-	Astragalus	.025	-	.025	-
28	38	Cerenium	.025	.069	-	.044
29	-	Arenaria	.010	-	.010	-
30	-	Castilleja	.010	-	.010	-
31	-	Cogswellia	.010	-	.010	-
32	39	Heuchera	.010	.052	-	.034
-	40	Polemonium	-	.017	-	.017
33	41	Lithospermum	.010	.277	-	.259
-	42	Leptotaenia	-	.017	-	.017
34	43	Aster	.010	.086	-	.074
35	-	Viola	.012	-	.012	-
36	-	Lygodesmus	.012	-	.012	-
37	-	Erodium	.006	-	.006	-
38	-	Artheronium	.006	-	.006	-
39	44	Monarda	.006	.008	-	.002
40	45	Sophia	.006	1.614	-	1.608
		Others	1.186	.312	.074	-
		TOTAL [illegible]	11.667%	19.937	3.483	11.387

1940 No.	1931 No.	[illegible]	Times Listed	Times Listed
-	36	Anaphalis		1
26	-	Lupula	34	
-	37	Vicia		1
27	-	Astragalus	25	
28	38	Geranium	6	2
29	-	Arenaria	9	
30	-	Castilleja	17	
31	-	Cogswellia	35	
32	39	Heuchera	12	2
-	40	Polemonium		1
33	41	Lithospermum	55	11
-	42	Leptotaenia		1
34	43	Aster	4	1
35	-	Viola	4	
36	-	Zygadenus	43	
37	-	Erodium	4	
38	-	Ertheronium	1	
39	44	Monarda	4	7
40	45	Sophia	10	7
		Others	89	5

Plant Composition Comparison

1940 No.	1931 No.	NAMES	Times Listed	Times Listed
1	1	Philadelphus lewisii	43	1
2	2	Amelanchier alnifolia	37	4
3	3	Rosa	47	11
-	4	Artemisia tridentata		4
4	5	Symphoricarpus	31	8
5	6	Prunus demissa	51	6
6	7	Crataegus douglasii	6	3
7	8	Sericotheca discolor	9	1
8	-	Juniperus scopulorum	8	
9	-	Populus trichocarpa	4	
10	9	Ribes	16	3
11	10	Artemisia frigida	42	10
12	-	Chrysothamnus	10	
13	11	Artemisia discolor	35	5
14	-	Opulaster malvaceous	4	
15	12	Spirea	5	1
16	13	Betula fontinalis	3	2
-	14	Artemisia gnaphalodes		1
17	-	Apocynum	4	
18	15	Salix	3	3
19	-	Artemisia cana	11	
20	16	Populus tremuloides	3	2
21	17	Rhus trilobata	3	1
-	18	Grossularia		1
22	19	Acer glabrum	12	2
-	20	Odostemon		1
23	21	Alnus tenuifolia	1	1
-	22	Toxicondendron	2	1
24	23	Cornus stolonifera	1	1
25	-	Rubus	4	
26	-	Clematis	2	
27	-	Gutierrezia sarothrae	2	
		Others	2	1

Plant Composition Comparison

1940 No.	1951 No.	GENUS	1940 Survey Percent	1951 Survey Percent	1940 Increase Percent	Decrease Percent
1	1	Philadelphus lewisii	.279	.052	.227	-
2	2	Amelanchier alnifolia	.267	.192	.075	-
3	3	Rosa	.211	1.069	-	.858
-	4	Artemisia tridentata	-	.210	-	.210
4	5	Symphoricarpus	.199	.911	-	.712
5	6	Prunus demissa	.143	.245	-	.102
6	7	Crataegus douglasii	.118	.157	-	.039
7	8	Sericotheca discolor	.105	.017	.088	-
8	-	Juniperus scopulorum	.093	-	.093	-
9	-	Populus trichocarpa	.093	-	.093	-
10	9	Ribes	.093	.175	-	.082
11	10	Artemisia frigida	.087	.578	-	.491
12	-	Chrysothamnus	.062	-	.062	-
13	11	Artemisia discolor	.056	.350	-	.294
14	-	Opulaster malvaceus	.043	-	.043	-
15	12	Spirea	.043	.087	-	.044
16	13	Betula fontinalis	.038	.087	-	.049
-	14	Artemisia gnaphaloides	-	.035	-	.035
17	-	Apocynum	.031	-	.031	-
18	15	Salix	.043	.433	-	.390
19	-	Artemisia cana	.018	-	.018	-
20	16	Populus tremuloides	.018	.087	-	.069
21	17	Rhus trilobata	.018	.035	-	.017
-	18	Grossularia	-	.017	-	.017
22	19	Acer glabrum	.012	.070	-	.058
-	20	Odosteron	-	.017	-	.017
23	21	Alnus tenuifolia	.012	.035	-	.023
-	22	Tonicolendron	-	.017	-	.017
24	23	Cornus stolonifera	.012	.052	-	.040
25	-	Rubus	.012	-	.012	-
26	-	Clematis	.006	-	.006	-
27	-	Gutierrezia sarothrae	.000	-	-	-
		Others	.013	.091	-	.034
		TOTAL	2.112	4.362	.748	3.498

DETERMINATION OF GRAZING CAPACITY

Method.

The feed production of the range is expressed in terms of forage acres. The figure used to convert forage acres to animal months and numbers of animals for various periods of months is known as the forage acre requirement. The forage acres on a unit of range, divided by the forage acre requirement for one month, gives the total number of animal months in the unit. The number of animals the unit will support for any given period may be determined in two ways:

1. Divide the number of animal months, derived as above, by the number of months the range is used. This will give the number of animals for that period of use.
2. Multiply the forage acre requirement for one animal for one month by the number of months the range is to be used. Divide this product into the number of forage acres in the unit. The result is the number of animals the feed on the unit of range will support for that period of use.

METHOD USED TO ESTABLISH FORAGE ACRE REQUIREMENT FOR GAME ANIMALS.

When this survey was requested, it was known that there were no figures worked out which represented the amount of feed

required for various kinds of game animals per head per month. Because of this deficiency it became necessary to formulate such figures from the most reliable sources of information available, and use these to obtain grazing capacity in numbers of animals for the various kinds of game involved. Buffalo, elk, mountain sheep, whitetail and blacktail deer were to be considered.

With forage acre requirements known for the average herd of cattle, it was possible to use comparative weights of game and cattle in order to determine an approximation of the requirement for each kind of game animal. Tests with cattle have shown that the amount of feed consumed is roughly proportional to the comparative weight of animals grazed.

Using weight as a base, with a known P.A. requirement for cattle, the requirements for various kinds of game were derived. These conclusions are subject to correction if and when actual controlled range tests are conducted with the various kinds of animals concerned, and the actual requirements derived therefrom. The method used was as follows:

Cattle

	No.		%		Weight		Ave. Weight
Cows	170	=	40	x	1070	=	428 lbs.
Yearlings	131	=	31	x	582	=	180 "
Bulls	13	=	3	x	1337	=	401 "
Calves	110	=	26	x	332	=	86 "
	424	=	100		Ave. weight		1095 "

The percentages of classes used above were derived from the average herd of range cattle.

Buffalo

	No.		%		Weight		Ave. Weight
Cows	169	=	40	x	910	=	364 lbs.
Yearlings	79	=	19	x	606	=	115 "
Bulls	89	=	21	x	1343	=	282 "
Calves	87	=	20	x	320	=	64 "
	424	=	100		Ave. Weight		825 "

The percentages of classes of buffalo used above were derived from numbers of each class using the Bison Range.

Derivation of Forage Acre Requirement

Ave. weight of cattle per head: 1095 lbs.

Ave. weight of buffalo per head: 825 lbs.

1095 : 8 :: 825 : X

1095X = 6600

X = .603

Forage acre requirement for buffalo: .6

The forage acre requirement .6 forage acres per head per month is derived from the above comparison. The base forage acre requirement was derived on a range of this same character which was producing a normal crop. The bison range is in a partially depleted condition and produces less to the

forage acre than the test area. Because of this, the .6 derived by computation has been increased to .7 of a forage acre per head per month in order to rectify this difference as nearly as possible.

This .7 requirement has been applied to all pastures except Trisky, spring and summer. This pasture is depleted to a greater degree than the others. Because of this, the forage acre requirement figure has been increased to .8 per head per month, which allows an added margin for recovery.

Forage acre requirements for elk and deer were derived by the above proportion using buffalo weight (825#) at .7 F.A.R., and elk weight (381) thus:

825 : .7 :: 381 : x

825X = 266.7

X = .323

The derived requirement .323 for elk, then, includes the correction for depleted range originally made between the derived buffalo F.A.R. of .6 and the adjusted requirement of .7.

Mule Deer

	No. on Range		%		Ave. Weight		
Bucks	70	=	35	x	225	=	79 lbs.
Does	80	=	40	x	173	=	69 "
Yearlings	50	=	25	x	138	=	34 "
					Ave. Weight		182 "

825 :: .7 :: 182 : X

825X = 127.4

X = .142 F.A.R. for mule deer

Whitetail Deer

	No. on Range		Percent		Ave. Weight		
Bucks	20	=	33.3	x 199	=	66	lbs.
Does	20	=	33.3	x 160	=	53	lbs.
Yearlings (20% less than does)	20	=	33.3	x 128	=	43	lbs.
				Ave. Weight		162	lbs.

825 : .7 :: 162 : X

825X = 113.4

X = .137 F.A.R. for whitetail deer

Mountain Sheep

F.A.R. for mountain sheep .142

Ave. weight 167 lbs.

SOURCES OF WEIGHTS USED

The above weights are averages of all animals of the same kind and include representative ages, sexes and weights as they occur in the herd. Calves are included as individuals and their weights averaged into the total.

Buffalo weights were obtained from scale weights taken at the National Bison Range. Elk weights (392 animals) were

secured from trapped animal scale weights at Yellowstone Park. Blacktail deer (135 animals) and Whitetail deer (33 animals) were obtained from scale weights from the Weight and Measurement Study, Region One, Forest Service, 1937. Mountain sheep weights were taken from scale weights at the National Bison Range and from "Lives of Game Animals", Vol. 3. "Hoofed Ruminants" by Ernest Thompson Seton. Cattle weights were obtained from the Montana Experiment Station, Northern Branch Station and stockyard scale weights. More than 1,000 head weights were used for cattle.

FORAGE ACRE DATA USED AND GRAZING CAPACITY FOR VARIOUS CLASSES OF GAME ANIMALS.

Buffalo	For. Acres	F.A. Req.	Period	No. Buffalo	
Alexander winter	882	.8	3.15 mo.		350
Pauline spring	371	.7	2.50 mo.	212	
Trisky Spring	276	.8	2.50 mo.	138	350
Alexander summer	311	.7	6.35 mo.	70	
Pauline summer	738	.7	6.35 mo.	166	
Trisky summer	559	.8	6.35 mo.	110	350
Driveway	18	.7	6.35 mo.	4	
	3155		12 mo.		350

Elk & Deer

Brush and timber areas not included as buffalo range were used as deer and elk range, totaling 372 forage acres. An additional 168 grassland forage acres were added. Total for deer and elk 540 forage acres. These were distributed, 250 for deer and 290 for elk, giving a yearlong grazing capacity of 75 elk and 153 deer.

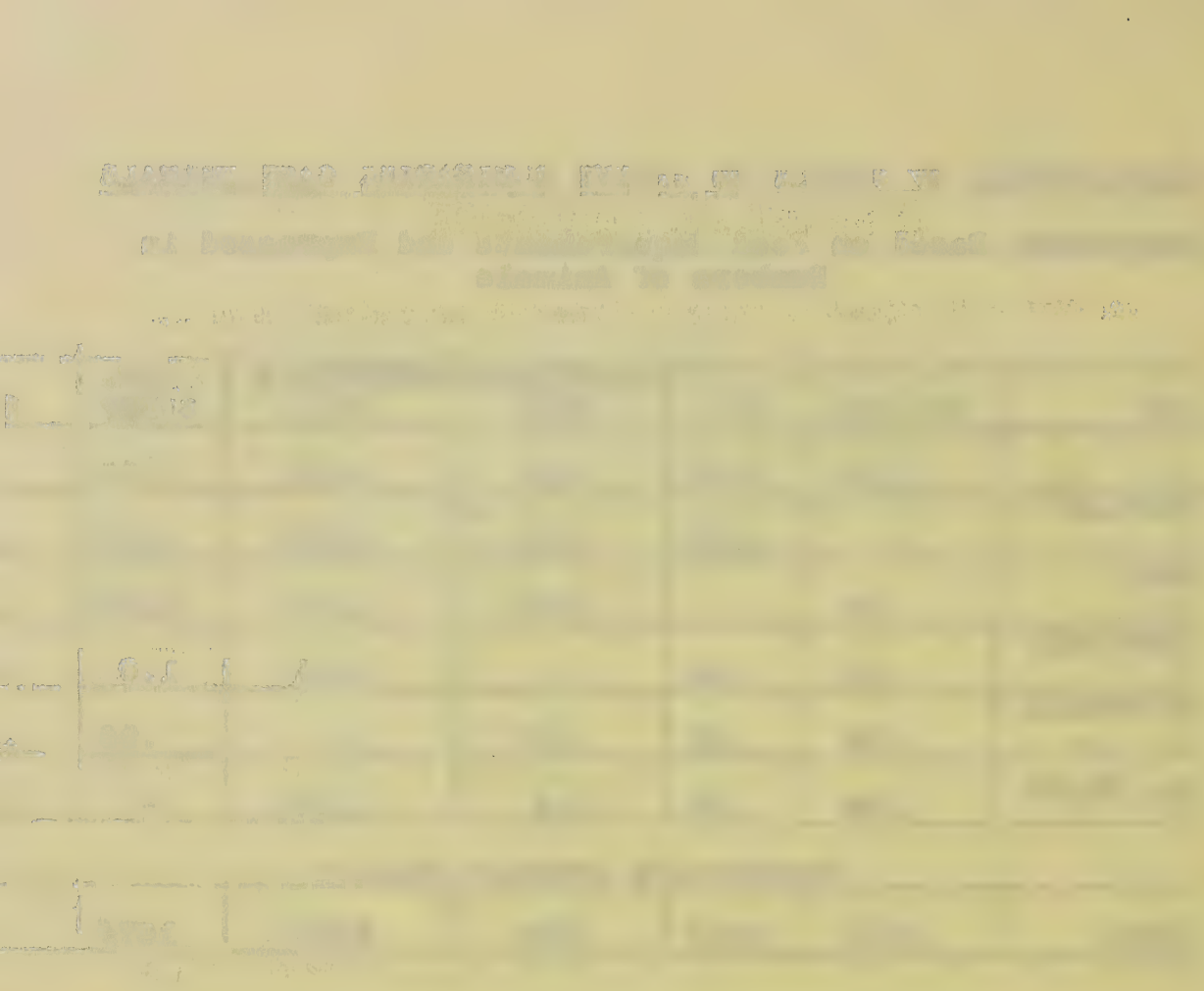
Mt. Sheep

In the upper end of the present sheep pasture which is to be fenced from the remainder of the present larger sheep pasture and used for mountain sheep, there are 66 forage acres. These will provide for 32 mountain sheep yearlong.

RELATIONSHIP OF CATTLE TO NATIVE RUMINATING GAME ANIMALS

Comparison Based on Feed Requirements and Expressed in Numbers of Animals

COW	BUFFALO	ELK	BLACKTAIL DEER	WHITETAIL DEER	MT. SHEEP	COW
1 -	1.33	2.48	5.63	5.84	5.63	-
Buffalo 1 -	-	1.86	4.22	4.38	4.22	.75
Elk 1 -	.54	-	2.27	2.36	2.27	.40
Blacktail 1 -	.24	.44	-	1.04	1.0	.18
Whitetail 1 -	.23	.42	.96	-	.96	.17
Mt. Sheep 1 -	.24	.44	1.0	1.04	-	.18
Comparative Average Weights						
1095#	895#	381#	182#	162#	167#	-



FOLLOW-UP AND MAINTENANCE

In order to have a current record of actual use to check against estimated average grazing capacity, the following should be recorded annually:

1. The actual number of buffalo which use each pasture, the dates of their entry and the date of leaving. Each buffalo, regardless of sex or age, will be counted as one animal. Compute as follows:

   Number of buffalo using pasture x number of days' use = animal days.

   Animal days ÷ 30 = animal months

Animal months' use will be recorded by pastures. This will maintain a current annual record by individual pastures which will be available for future use.

2. Annual counts of elk, blacktail and whitetail deer should also be made. The use by these animals represents a part of the use made of the range each season. Their numbers may influence the future stocking by buffalo.

Mountain sheep should also be counted annually, but since they will be confined to a separate pasture, their use will not be included with that of the general range outside the sheep pasture, unless the sheep actually use it. If it is used by sheep, such use will be included. A sheep pasture record should also be maintained. The

annual count should be made during the same month each year, preferably in the fall.

3. These annual records will be plotted on a graph annually to maintain a visual population record which will indicate the deviation of the annual actual use from the estimated capacity.

4. Compute as follows:

No. of buffalo in herd		=	437
No. of elk	48 ÷ 2.48	=	15 buffalo
No. of blacktail deer	100 ÷ 4.22	=	24 buffalo
No. of whitetail deer	36 ÷ 4.38	=	8 buffalo
Total use expressed in terms of buffalo -			484 buffalo

The number of animals used in the above illustration was taken from the Bison Range Inventory for 1940.

5. This record of use can best be made by resolving all animals to terms of buffalo. To do this use the following table to convert other animals to buffalo:

2.48 elk	=	1 buffalo
4.22 blacktail deer	=	1 buffalo
4.38 whitetail deer	=	1 buffalo
4.22 mountain sheep	=	1 buffalo

6. Plot as illustrated on the graph on page 20.

An excellent stand of bluebunch wheatgrass and fescue covered the slopes of Trisky Creek in 1931 when the above photo was taken. This range was then in nearly original condition.

On the same area in 1940 the splendid native grass had been replaced by short, early maturing sandberg bluegrass as the result of overuse by buffalo, augmented by pocketing caused by the barrier of the lower sheep pasture fence.

Photo from near High Point taken in 1931 looking toward St. Ignatius, showing the native grass cover on the ground at that time.

Photo from the same point taken in 1940 showing the replacement cover of sandberg bluegrass. The native bluebunch wheatgrass and fescue have disappeared. The bluegrass replacement produces much less feed than the native grass and is of value mostly as spring and fall feed.

Looking east toward St. Ignatius in 1940, showing well developed erosion caused by overstocking and holding buffalo too long in the Trisky Creek pasture. Proper stocking and seasonal control would have prevented this.

Alexander Basin range, 1940. The white spots are cheatgrass encroaching into the Idaho fescue on this north exposure. The south facing slope in the foreground is becoming dangerously thinned.